Making a "Solution" Cave

suggested grade levels: 4-8

Overview:

Solution caves are formed by slightly acidic ground water circulating through fractures in limestone. Even slightly acidic water is capable of dissolving great quantities of this soluble rock. As time passes, the openings become larger and larger until they may be large enough for a man to pass through. This simple experiment will let students observe a process that normally takes many, many, years in real life. It is a fun activity for students and it encourages them to work together.

Materials:

Scissors

Clear plastic bottle, such as a small bottled-water container or a 1-2 liter soda bottle

Piece of aluminum foil

Large nail

Glass bottle or jar with an opening larger than that of the plastic bottle

5 cups (725 g) of sand

Rubber band

1 cup (200 g) of granulated sugar or sugar cubes

1 cup (236.6 ml) of warm water

Spoon or trowel

Activity: (Can be done as a demo if supplies are limited)

1. Cut off the bottom half of the plastic bottle. Remove the cap.

2. Fit the piece of aluminum foil over the mouth of the plastic bottle and Hold it in place tightly with a rubber band. Use the nail to punch a few small holes in the foil.

3. Place the plastic bottle upside down inside the opening of the larger glass bottle so it can act as a funnel.

4. Put a 2-inch (5 cm) layer of damp sand in the plastic bottle. Press it down so there are no air spaces.

5. Put a 1-inch (2.5 cm) layer of sugar or sugar cubes on top of the sand. Be sure it is pressed against the side of the bottle and filled in solidly. The sugar represents limestone under the ground.

6. Put another 2- or 3-inch (5 or 8 cm) layer of sand on top of the sugar. Press out all spaces. You should be able to clearly see three layers.

7. Pour 1/2 cup (118.3 ml) of warm water on top of the top layer of sand. Wait until it drains down, and then pour the other 1/2 cup (118.3 ml) of water. Watch what happens to the sugar (the limestone) after two or three hours. What has caused the caves that you see? What does this show you about how caves might form underground?